AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0003] with the following:

[0003] Fig. 10 shows an example of an object detector 100 using a phased array antenna. The phased array antenna comprises an array antenna having a plurality of arranged antenna elements, and a plurality of phase shifters each controlling a feeding phase to each antenna element. The phased array antenna can obtain a desired beam configuration by using a directional synthesis of each element, and can switch a beam direction electronically by differentiating a feeding phase every element.

Please replace paragraph [0005] with the following:

[0005] When an object is detected, a feeding phase is set such that the beam direction is oriented to the detection region A first, and the electric wave is irradiated to the detection region A and its echo is observed. When the object exists in the detection region A, a power intensity of the echo (reception power intensity) becomes strong. Therefore, the existence of the object in the detection region A can be detected by determining whether the reception power intensity exceeds a predetermined threshold value or not. Similarly, the detection regions B to E are sequentially scanned, so that object detection can be performed within a range of 50 degrees.

Please replace paragraph [0009] with the following:

[0009] When the method of the ~~patent document 1~~ JP Publication No. 08-105955 is employed, although the antenna area is not enlarged, two types of phase shifter circuits for transmission and reception are required and also phase shift value

setting with high precision is required, causing the phase shifter circuit to be complicated. Therefore, practical application is difficult at a consumer level.

Please replace paragraph [0010] with the following:

[0010] Furthermore, when the beam direction is controlled finely over wide angles, very high-performance phase shifter is required, and designing and manufacturing of the antenna or a line length become severe. Consequently, there are provided problems that the constitution becomes complicated, its yield is lowered, its cost is increased and the like. In addition, when the continuous scanning is implemented as in the ~~patent document 2~~ IP Publication No. 07-106839, it is necessary to provide a compensation circuit or the like in order to prevent a characteristic change due to temperature variations of the phase shifter and the amplifier, and also the control with high precision is required, causing the constitution to be complicated and the cost to be increased.

Please replace paragraph [0014] with the following:

[0014] The "detection region" is a region determined by the beam width and the beam direction of the antenna and it means a range where the antenna can irradiate the electric wave and receive the echo reflected by the detection object. Aspects of "overlapping" of the detection regions comprises an aspect in which a part of one detection region overlaps a part of another detection region, an aspect in which a part of one detection region overlaps the whole of another detection region, and an aspect in which the whole of one detection region overlaps a part of another detection region.

Please replace paragraph [0021] with the following:

[0021] As an execution manner of the above described each operation, for example, there is a manner in which the bearing of the object is specified after the detection results concerning all of the predetermined plural detection regions are obtained. Since this manner is simple in logic, it can be implemented by a hardware (logic circuit).

Please replace paragraph [0027] with the following:

[0027] According to the present invention described above, since the bearing of the detection object can be narrowed down to a range smaller than that of the detection region which is based on the directional characteristics of the antenna, the bearing resolution can be improved with the simple constitution without enhancing the directional characteristic of the antenna or controlling a variation amount of the beam direction finely, that is, without causing the antenna to be enlarged and complicated and without increasing its cost.

Please replace paragraph [0044] with the following:

[0044] The digital phase shifter 3 for switching a feeding phase is connected to each antenna element 2a. The phase shifter 3 changes over a line length through a switch to make the feeding phase variable by stages every $n\pi/2m$ (n: integer of 0 or more and m: integer of 1 or more). According to this embodiment, the phase shifter 3 which can set four kinds of feeding phases such as 0, $\pi/4$, $2\pi/4$ and $3\pi/4$ is used.

Please replace paragraph [0050] with the following:

[0050] The primary detection region A is a region formed by directional characteristics of the beam direction of 0 degree/the beam width of 10 degrees and ranges over -5 degrees to +5 degrees. The primary detection region B is a region formed

by directional characteristics of the beam direction of – 20 degrees/the beam width of 10 degrees and ranges over – 25 degrees to -15 degrees. The primary detection region C is a region formed by directional characteristics of the beam direction of +20 degrees/the beam width of 10 degrees and ranges over +15 degrees to +25 degrees. The primary detection region D is a region formed by directional characteristics of the beam direction of 0 degree/the beam width of 20 degrees and ranges over -10 degrees to +10 degrees. The primary detection region E is a region formed by directional characteristics of the beam direction of -20 degrees/the beam width of 20 degrees and ranges over -30 degrees to -10 degrees. The primary detection region F is a region formed by directional characteristics of the beam direction of +20 degrees/the beam width of 20 degrees and ranges over +10 degrees to +30 degrees. The primary detection region G is formed by directional characteristics of the beam direction of 0 degree/the beam width of 40 degrees and ranges over -20 degrees to +20 degrees. The primary detection region H is a region formed by directional characteristics of the beam direction of -20 degrees/the beam width of 40 degrees and ranges over -40 degrees to 0 degree. The primary detection region I is a region formed by directional characteristics of the beam direction of +20 degree/the beam width of 40 degrees and ranges over 0 degree to +40 degrees.

Please replace paragraph [0054] with the following:

[0054] Thus, each of the secondary detection regions (1) to (14) can be recognized as one or a combination (overlap) of two or more primary detection regions and it is a unit sectioned by boundaries of the respective primary detection regions. Therefore, the secondary detection region has a width surely narrower than that of the primary detection region.

Please replace paragraph [0066] with the following:

[0066] At step S4, the best signal is generated from the transmission signal and the reception signal by the radar module 6 and output to the signal processing circuit 7. The signal processing circuit 7 performs A/D conversion to the beat signal and performs FFT (Fast Fourier Transform) to it to obtain reception power intensity data. When the object exists in the relevant primary detection region, the reception power intensity is higher than that when it does not exist. The signal processing circuit 7 determines whether the object exists or not by determining that the reception power intensity exceeds a given threshold value or not.

Please replace paragraph [0070] with the following:

[0070] An example of the logical operation expressions is shown in FIG. 4A, in which reference character Vx designates a detection result (logical value) of the primary detection region X, reference sign & designates an AND operator and reference sign | designates an OR operator. When the operation result obtained by assigning the detection results of the primary detection regions A to I to each logical operation expression is "1", it can be specified that the object exists in the relevant secondary detection region. In this example, since Ve, Vg and Vh are "1" and others are "0", only the fifth expression is "1" and it can be understood that the object exists in the bearing of the secondary detection region (5). Thus, since the bearing specifying operation is performed by the logical operations in this embodiment, the processing cost can be extremely lowered and the bearing can be specified at high speed.

Please replace paragraph [0079] with the following:

[0079] Although the bearing where the object exists is specified after the detection results referring to all of the predetermined nine primary detection regions A to I are obtained in the first embodiment, according to this embodiment, scanning is

repeated only for a set of the primary detection regions (H and I) by which the whole detection range can be scanned by the least number of scanning among the predetermined nine primary detection regions A to I (normal scanning mode), and then, when the object was detected in the primary detection region H or I, scanning is started for the other primary detection regions (A to G) required for narrowing down the bearing where the object exists (refined scanning mode).

Please replace paragraph [0084] with the following:

[0084] At step S14, the primary detection region to be scanned next is determined to narrow down the bearing. FIG. 6 is a block diagram showing setting orders of the primary detection regions in the refined scanning mode. Arrows of solid lines designate the primary detection region to be scanned next when the object was detected, and arrows of dotted lines designate the primary detection region to be scanned next when the object was not detected. For example, when the object was detected at the primary detection region H, the primary detection region E is set next. When the object was detected at the primary detection region E, the primary detection region B is set next. Alternatively, when the object was not detected, the primary detection region D is set next.

Please replace paragraph [0091] with the following:

[0091] In addition, since the aspects of the other apparatus constitution and primary and secondary detection regions are the same as that of the first and second embodiments, detailed description thereof is omitted here.

Please replace paragraph [0094] with the following:

[0094] Thus, according to this embodiment, since the same effects as in the first and second embodiments can be provided and scanning is only performed within bare essentials of range, the number of scanning can be further reduced and more effective object detecting can be performed.

Please replace paragraph [0097] with the following:

[0097] As described above, the object detector 1 performs an operation for reducing the number of elements to be fed in order to enlarge the beam width of the array antenna 2. However, when the number of the elements is reduced, a power irradiated from the array antenna 2 in total is reduced depending on the reduced number of the elements, causing a gain to be lowered as the whole of the antenna. As a result, a limit distance (distance from the antenna) at which the object can be detected is different from the other when the beam width is large and when the beam width is narrow.

Please replace paragraph [0105] with the following:

[105] A control circuit 5 controls an amplification factor of an amplifier 10 depending on the beam width (the number of elements to be fed) to make the antenna gain constant, that is, to make the limit distances at which the object can be detected the same when the beam width is wide and when it is narrow.